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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,912	02/25/2004	Kenichi Nara	4041K-000177	6740
27572 7590 10/16/2008 HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303				
EXAMINER				
DUONG, THO V				
ART UNIT		PAPER NUMBER		
3744				
MAIL DATE		DELIVERY MODE		
10/16/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/786,912

Applicant(s)

NARA ET AL.

Examiner

Tho v. Duong

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 9-15, 22, 24, 25 and 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 16-21, 23, 26, 28 and 30-35 is/are rejected.
- 7) ☒ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/US)
Paper No(s)/Mail Date 9/14/04: 7/5/05 and 9/2/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ ~~Notice of Informal Patent Application~~
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Claims 9-15 and 29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election of species B and the piston of figure 12 was made **without** traverse in the reply filed on 6/20/08. The examiner further withdraw claims 22, 24 and 15 from further consideration since the subject matter of claims 22 and 24 directs to the non-elected species of figure 16 and the subject matter of claim 25 directs to the non-elected species of figure 18.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 recites the limitation "the moving body and "the central portion" in lines 2 and 4, respectively. There are insufficient antecedent bases for these limitations in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-6, 28, 30 and 33-35 are rejected under 35 U.S.C. 102(a) as being anticipated by Cao et al. (US 6,684,941). Cao discloses (figures 1-3) a fluid drive unit for vibrating fluid charged in a passage in a direction of the passage comprising a moving piece accommodating cylinder (30) communicating with both end portions (15) of the passage, a moving piece (piston 45) which is made of magnet, slidably accommodated in the moving piece accommodating cylinder, the fluid in the passage being accommodated in spaces interposed between both end portion of the moving piece accommodating portion in the portions of the passage; and a drive means (35,40) for reciprocating the moving piece in the moving piece accommodating portion in the sliding direction, wherein the fluid charged in the passage is vibrated in the passage direction when the moving piece is reciprocated by the drive means; the piston(45) includes a pair of sliding member (peripheral portion) arranged at symmetrical positions on both sides of the moving piece in the sliding direction, the sliding member composes a sliding face of the piston; a spring member (55) which is considered to be vibration sound suppressing member since the spring member can prevent end of the piston from colliding with the cylinder; a heat transport body having a passage (15) communicating with the moving piece cylinder, wherein heat is exchanged with the fluid vibrating in the passage when the fluid drive unit is operated so as to transport heat, which is supplied from an external heat source (20), to a flow temperature portion (25); the heat transport, which is composed in a manner such that the moving directions of the fluid in the passages, which are adjacent to each other, are opposite to each other, the heat transport body exchange heat with the fluid vibrating in the passage when the fluid drive unit is operated.

Claims 1-8 and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimado Koji (JP 404027773A). Shimado discloses (figure 3)) a fluid drive unit for vibrating fluid charged in a passage in a direction of the passage comprising a moving piece accommodating cylinder (31a) communicating with both end portions (43,44) of the passage, a moving piece (piston 8) which is made of permanent magnet, slidably accommodated in the moving piece accommodating cylinder, the fluid in the passage being accommodated in spaces interposed between both end portion of the moving piece accommodating portion in the portions of the passage; and a drive means including exciting coil (53) for reciprocating the moving piece in the moving piece accommodating portion in the sliding direction, wherein the fluid charged in the passage is vibrated in the passage direction when the moving piece is reciprocated by the drive means; the piston(8) includes a pair of sliding member (3,4) arranged at symmetrical positions on both sides of the moving piece in the sliding direction, the sliding member composes a sliding face of the piston; and a spiral groove (57) formed on a surface of the piston extending from one end to the opposite end of the piston, including the central portion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao in view of Farkos (US 3,791,770). Cao substantially discloses all of applicant's claimed

invention as discussed above except for the limitation that the drive means includes an annular exciting coil, whereas Cao discloses a pair annular drive means (35,40) surrounding the piston . Farkos discloses (figure 1) a reciprocating pump that has drive means includes coils for a purpose of creating an electromagnetic field causing the piston to move back and forth. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Farkos's teaching in Cao's device for a purpose of creating an electromagnetic field causing the piston to move back and forth.

Claims 1-8,16-17,26,28,30,33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delong (US 4,692,673) in view of Cao (US 6,684,941). Delong discloses (figures 2, and 4-5) a fluid drive unit for vibrating fluid charged in a passage, comprising a moving piece accommodating cylinder (10,36), a moving piece (piston 7,22) which has a permanent magnet (8,23), slidably accommodated in the moving piece accommodating cylinder, and a drive means (6) for reciprocating the moving piece in the moving piece accommodating portion in the sliding direction, wherein the fluid charged in the passage is vibrated in the passage direction when the moving piece is reciprocated by the drive means; the piston(7,22) includes a pair of sliding member arranged at symmetrical positions on both sides of the moving piece in the sliding direction, the sliding member composes a sliding face of the piston; the drive means (6) includes a pair of annular exciting coils surrounding a side of the moving piece accommodating portion in the sliding direction of the moving piece, the pair of the annular exciting coils are arranged parallel to each other in the sliding direction of the piston, and the piston is reciprocated by a magnetic force generated by the pair of exciting coils; and a passage connecting member (2,41) engaging with an opening end of the moving piece accommodating

portion (10,36) for connecting an end portion of the passage with the moving piece accommodating portion so that the passage and the moving piece accommodating portion can communicate with each other; an elastic sealing member (15,45) providing in an engaging portion of the passage connecting member with the moving piece accommodating portion, wherein the passage connecting piece (2,41) is fixed to the moving piece accommodating portion by an elastic force of the elastic sealing member. Delong does not disclose a heat transport system that uses the fluid drive unit in vibrating the fluid in the passage between two ends of the passage and a vibration sound suppression member. Cao disclose a fluid drive unit in a heat transport body having a passage (15) communicating with the moving piece cylinder, wherein heat is exchanged with the fluid vibrating in the passage when the fluid drive unit is operated so as to transport heat, which is supplied from an external heat source (20), to a flow temperature portion (25); the heat transport, which is composed in a manner such that the moving directions of the fluid in the passages, which are adjacent to each other, are opposite to each other, the heat transport body exchange heat with the fluid vibrating in the passage when the fluid drive unit is operated; and a spring member (55) provided in the moving piece accommodating portion, which is capable of suppressing vibration sound generated by the reciprocating motion of the piston. Cao has disclosed the use of the fluid drive unit in a heat transport system for a purpose of transferring heat between a low temperature region to the higher temperature region. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Cao's teaching in Delong's device for a purpose of transferring heat between a low temperature region to the higher temperature region.

Claims 18-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delong and Cao as applied to claims 1-8 and 16-17 above, and further in view of either Ikunori et al. (JP 11-155273) or Yamamoto Yasuchi (JP 2002-257232). Delong and Cao substantially discloses all of applicant's claimed invention as discussed above except for the limitation that a permanent magnet is arranged between the temporary magnet arranged at both ends, whereas Delong discloses a permanent magnet (8) is disposed in a cylindrical holder and two end portions (9) attached to the permanent magnet. Delong is silent about the type of material of two end portions (9) attached to the permanent magnet (7). However, it is well known in the art that a movable piston comprising of a permanent magnet inserted between temporary magnets. In particular, both references to Ikunori and Yamamoto disclose a movable piston reciprocates within a housing under electromagnetic force generated by the coiled driving unit, wherein the movable piston comprising of a permanent magnet (4) or (361) respectively, inserted between two temporary magnets (5,6) or (362,363) respectively, for a purpose of forming a total magnetic piston so that the reciprocating force is enhanced. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either Ikunori's or Yamamoto's teaching in the combination device of Delong and Cao for a purpose of forming a total magnetic piston so that reciprocating force is enhanced. Regarding claims 20-21, applicant has not disclosed any criticality or any unexpected result of having the length of each temporary magnet being 16-42% or 25% of the length of the exciting coil. Accordingly, the claimed range of length ratio between the temporary magnet and the coil is deemed to be a design consideration which fails to patentably distinguish over the prior arts. Furthermore, basing on the geometrical relationship, Delong, Ikunori and Yamamoto disclose (figures 5, 7 and 1 respectively) that the

ratio between the length of the temporary magnet and the coil is well within the claimed range of 16-42%.

Allowable Subject Matter

Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bremer et al. (US 4,799,421) discloses a hydrodynamic spiral grooved journal bearing for electromagnetically rotated and reciprocating compressor piston.

Leland (US 5,005,639) discloses a ferrofluid piston pump.

Farkos (US 3,740,171) discloses an electromagnetic pump or motor device.

A. Basilewsky (US 2,690,128) discloses an electromagnetic pumping device.

Scotti et al. (US 5,238,056) discloses a heat exchanger with oscillating flow.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tho v. Duong whose telephone number is 571-272-4793. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tyler J. Cheryl can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tho v Duong/
Primary Examiner, Art Unit 3744